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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/643,004

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Garry A. Mercaldi

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10/06/2004

WELLS ST. JOHN P.S.  
601 W. FIRST AVENUE, SUITE 1300  
SPOKANE, WA 99201

EXAMINER

MALDONADO, JULIO J

ART UNIT

PAPER NUMBER

2823

DATE MAILED: 10/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/643,004	<b>Applicant(s)</b> MERCALDI, GARRY A.	
	<b>Examiner</b> Julio J. Maldonado	<b>Art Unit</b> 2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 July 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 9-41 and 47-69 is/are pending in the application.
- 4a) Of the above claim(s) 52,53,55-57 and 59 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 9-18,21,22,25-33,35,37-41,47,48,50,54,58 and 62-69 is/are rejected.
- 7) ☒ Claim(s) 19,20,23,24,34,36,49,51,60 and 61 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. The rejection as set forth in the Office Action mailed on 04/20/2004 is withdrawn in view of further review of the prior art of record.
2. The addition of claims 60-69 in paper filed on 07/20/2004 is acknowledged.
3. Claims 9-41 and 47-69 are pending in the present application, from which claims 52, 53, 55-57 and 59 were withdrawn from consideration.

### ***Information Disclosure Statement***

4. The information disclosure statement filed 07/20/2004 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because reference AC to U.S. 5,290,824 corresponds to Mandal et al., not Ishikawa et al. as submitted. It has been placed in the application file, but the information referred to therein has not been considered as to the merits. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609 ¶ C(1).

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 9-18, 21, 22, 25-33, 35, 37-41, 47, 48, 50, 54, 58, 62, 63-69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zenke (U.S. 6,258,690 B1) in view of Nogami et al. (U.S. 6,060,383) and Bohling et al. (U.S. 5,124,278).

Zenke (Figs.1A-5E) teaches a method of forming a nucleation layer (5) for a dielectric layer (6) used to form a capacitor, wherein said nucleation layer (5) is formed on a first surface and a second surface of a substrate (1), wherein the first surface is SiO<sub>2</sub> dielectric layer (2) and the second surface is a polysilicon electrode (3) and said process is performed in a single chamber or multiple chamber apparatus. This process include the steps of forming an LPCVD-amorphous silicon layer (4) on said first and second surface; performing a thermal nitridation on said amorphous silicon (4), turning it into a Si<sub>3</sub>N<sub>4</sub> nucleation layer (5); and forming an LPCVD Si<sub>3</sub>N<sub>4</sub> layer (6), wherein said LPCVD Si<sub>3</sub>N<sub>4</sub> layer (6) is deposited non-selectively on the first surface and on the second surface, even though the first and second surfaces of the substrate (1) exhibit a property of the deposition layer forming less readily on the first surface compared to the second surface (column 2, line 43 – column 3, line 19, column 3, line 63 – column 4, line 4 and column 5, lines 34 – 60).

Zenke fails to teach forming the nucleation layer and the deposition layer by an ALD process. However, Nogami et al. teach depositing silicon nitride on a first surface of SiO<sub>2</sub> and on a second surface of polysilicon (column 6, lines 43 – 67) using either an ALD process or a CVD process (column 8, lines 20 – 43). It would have been within the scope of one of ordinary skill in the art to combine the teachings of Zenke and Nogami et al. to enable the deposition step of Zenke to be performed according to the teachings

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of Nogami et al. because one of ordinary skill in the art at the time the invention was made would have been motivated to look to alternative suitable methods of performing the disclosed deposition step of Zenke and art recognized suitability for an intended purpose has been recognized to be motivation to combine. MPEP 2144.07.

Alternatively, Bohling et al, teach conventional methods of forming amorphous silicon layers and  $\text{Si}_3\text{N}_4$  layers include LPCVD and atomic layer deposition (column 9, line 51 – column 10, line 47). It would have been within the scope of one of ordinary skill in the art to combine the teachings of Zenke and Nogami et al. with the teachings of Bohling et al. to enable forming the amorphous silicon layer of Zenke and Nogami et al. to be performed according to the teachings of Bohling et al. because one of ordinary skill in the art at the time the invention was made would have been motivated to look to alternative suitable methods of performing the disclosed deposition step of Zenke and art recognized suitability for an intended purpose has been recognized to be motivation to combine. MPEP 2144.07.

The combined teachings of Zenke Nogami et al. and Bohling et al. substantially teach all aspects of the invention but fail to disclose wherein the CVD deposition of the nucleation layer occurs non-selectively at a temperature no greater than about 645°C and at a pressure of form about 0.5 Torr to about 1.5 Torr; and wherein the ALD nucleation layer is deposited at a temperature of form about 400 to about 550°C and at a pressure of form about 0.1 Torr to about 20 Torr. However, the selection of the deposition specifications is obvious because it is a matter of determining optimum process condition by routine experimentation with a limited number of species to obtain

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a desired layer formation process. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the above-mentioned layer formation specifications to arrive at the claimed invention.

***Allowable Subject Matter***

7. Claims 19, 20, 23, 24, 34, 36 49, 51, 60 and 61 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Response to Arguments***

8. Applicant's arguments filed 07/20/2004 have been fully considered but they are not persuasive.

In response to applicants' arguments regarding the restriction mailed on 12/16/2003, although if a claim reads different inventions, the fact that a claim does so read is not conclusive that it is generic. It may define only an element or subcombination common to the several species. See MPEP 804.029(d).

***Conclusion***

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Julio J. Maldonado whose telephone number is (571) 272-1864. The examiner can normally be reached on Monday through Friday.

10. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri, can be reached on (571) 272-1855. The fax number for this group is 703-872-9306 for before final submissions, 703-872-9306 for after final

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submissions and the customer service number for group 2800 is (703) 306-3329.

Updates can be found at <http://www.uspto.gov/web/info/2800.htm>.

Julio J. Maldonado  
Patent Examiner  
Art Unit 2823

Julio J. Maldonado  
October 4, 2004



Oik Chaudhuri  
Supervisory Patent Examiner  
Technology Center 2800